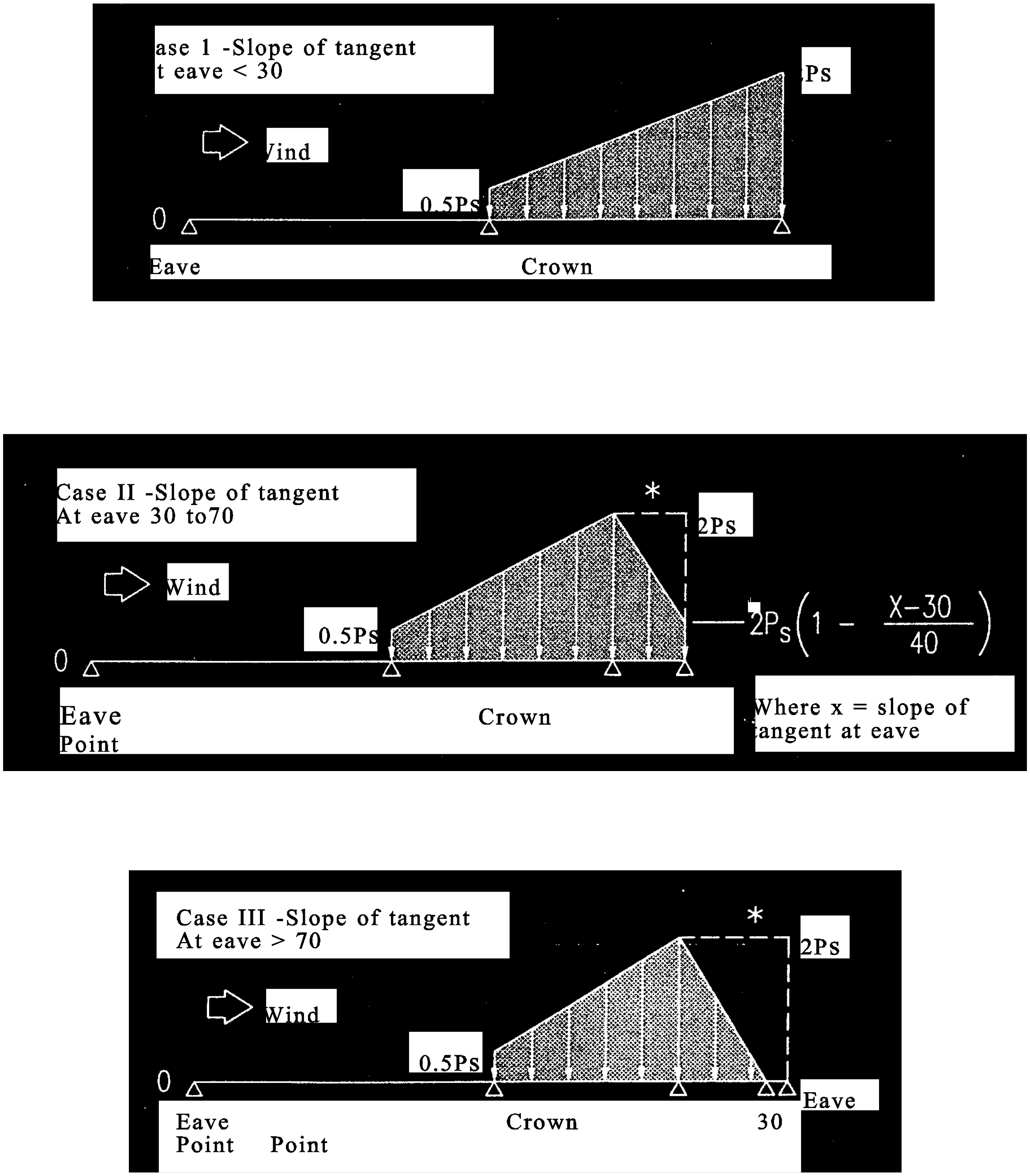
Figure 1610.2
UNBALANCED LOADING CONDITIONS FOR CONVEX CURVED ROOFS

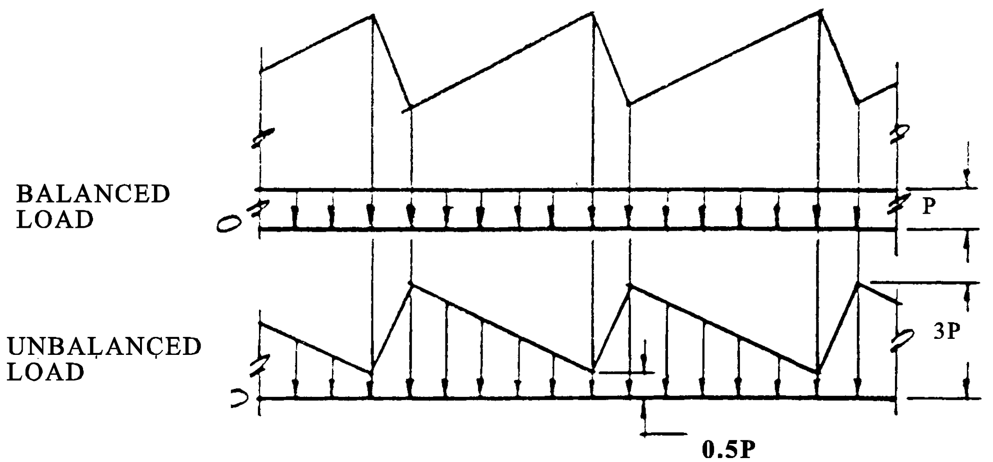


***Distribution of snow load where the ground or another roof abuts at or less than 3'-0 from eave**.

1610.5.3 Unbalanced snow load for multiple roofs: For multiple folded-plate, sawtooth, and barrel vault roofs, the unbalanced snow load shall be as shown on Figure 1610.3. In the figures, $P_?$ is the basic snow load intensity. The snow depth above the valleys need not exceed the level of the snow above the ridges, and the maximum snow *load* intensity in the valleys may be reduced accordingly.

Snow depth and reduced snow *loads* shall be determined from the assumed density of snow, D, of 20 pcf.

Figure 1610.3
BALANCED AND UNBALANCED LOADS ON A SAWTOOTH ROOF



1610.6 Snow Drift loads at changes in roof elevation and at roof projections: Multi-level roofs, lower roofs and decks of adjacent structures, and roofs adjacent to projections shall be designed in accordance with 780 CMR 1610.6.1 through 1610.6.6.

1610.6.1 Design loads at changes in roof elevation: The drift load on lower roofs or decks at changes in roof or deck elevation shall be taken as the triangular loading surcharge superimposed on the uniform roof snow *load*, P? , as shown in Figure 1610.4

Two types of drifts shall be considered:

1. from wind blowing snow from the upper roof
2. from wind in the opposite direction blowing snow from the lower roof

The drift causing the more severe structural effect shall be used for design

The density of snow, *D* in a snowdrift and in the uniform layer of snow underlying the drift shall be not less than:

$$D = 20pcf \qquad \text{(Equation 3)}$$

The height, h_b , of the uniform snow layer underlying the drift shall be:

$$h_b = \frac{P_{ü}}{D} \qquad \text{(Equation 4)}$$

The intensity of snow load at any point shall be the total depth, at that point, of the snowdrift and the underlying uniform layer of snow, times the density, D.

Figure 1610.4
DRIFTING SNOW ON LOWER ROOFS AND DECKS AT CHANGES IN ROOF OR DECK ELEVATIONS

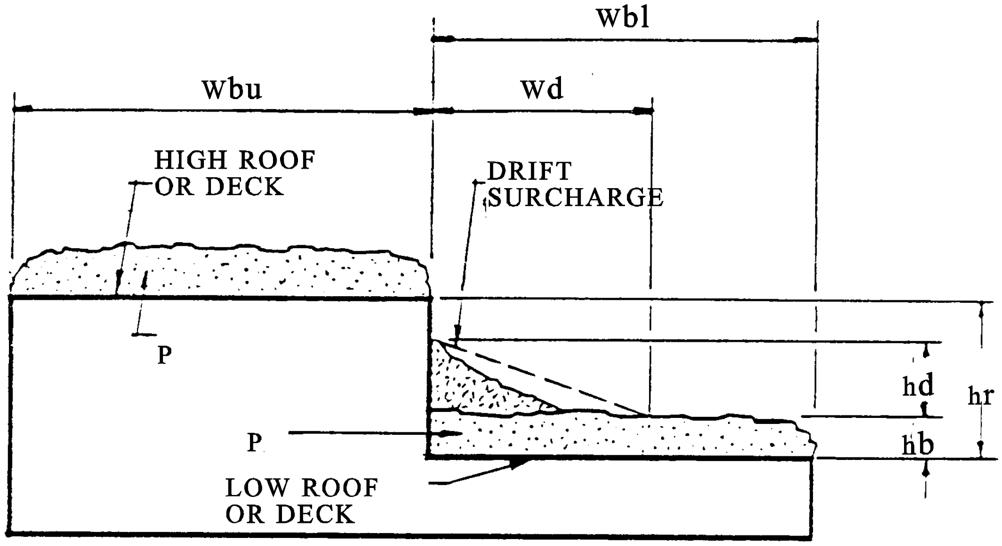


Figure 1610.5
HEIGHT OF DRIFT AT CHANGE IN ROOF ELEVATION

1610.6.1.1 Drifting of snow from upper roof: The height of drift, h_d, and the width of drift, W_d, both in feet shall be determined as follows:

a. Compute the potential drift height H_{du}, in feet, and the cross-sectional areas of drift, A_d, in square feet, as:

$$H_{du} = 1.15(W_{bu})^{0.33} - 1.5 \quad \text{(Equation 5)}$$

(Alternately, H_{du} may be determined from Figure 1610.5)

$$A_d = \frac{(H_{du})(4H_{du})}{2} = 2H_{du}^2 \quad \text{(Equation 6)}$$

b: If ($H_{du} + h_b$) is less than or equal to the difference in roof elevations, h_r, then:

$$H_d = H_{du} \quad \text{(Equation 7)}$$

$$W_d = 4(H_{du}) \quad \text{(Equation 8)}$$

c: If ($H_{du} + h_b$) is greater than h_r:

$$h_d = h_r - h_b \quad \text{(Equation 9)}$$

$$W_d = \frac{2(A_d)}{h_r - h_b} \quad \text{(Equation 10)}$$

W_d need not exceed 10 $(h_r - h_b)$

1610.6.1.2 Drifting of snow from lower roof: The height of drift, h_d, and the width of drift, W_d, both in feet shall be determined as follows:

a. Compute the potential drift height, H_{dl}, in feet, as:

$$H_{dl} = 0.5[1.15(W_{bl})^{0.33} - 1.5] \quad \text{(Equation 11)}$$

(Alternatively, H_{dl} may be determined from Figure 1610.5)

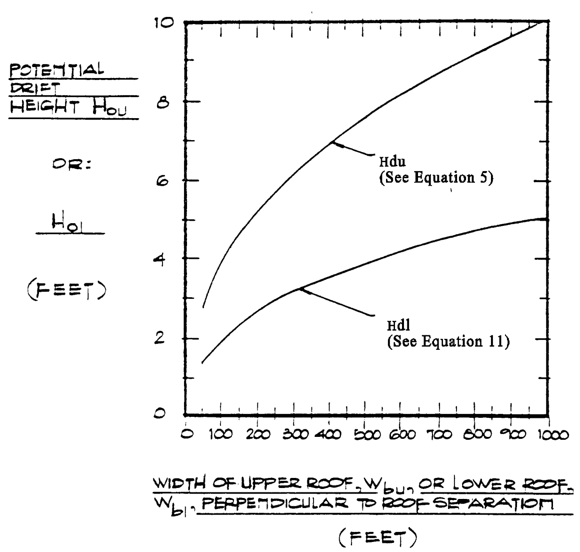
b. If ($H_{dl} + h_b$) is less than or equal to h_r, then:

$$h_d = H_{dl} \quad \text{(Equation 12)}$$

c. If ($H_{dl} + h_b$) is greater than h_r, then:

$$h_d = h_r - h_b \quad \text{(Equation 13)}$$

$$W_d = 8(h_d) \quad \text{(Equation 14)}$$



WIDTH OF UPPER ROOF, W_{bu}, OR LOWER ROOF, W $_{bl}$, PERPENDICULAR TO ROOF SEPARATION

1610.6.1.3 Multiple level roofs: For multiple stepped roofs similar to that shown in Figure 1610.6a, the sum of all the roof lengths upwind above the drift under consideration shall be considered as the length of upper roof for that drift (as shown, for example, in Figure 1610.6a).

For multiple level roofs similar to that shown in Figure 1610.6b, if the total calculated height of a drift and the underlying uniform snow layer on the upwind side of a higher roof ($h'_d + h_b$) is equal to or greater than $0.7h_r$, then the length, W_{bu} *, as shown in Figure 1610.6b, shall be used in place of W_{bu} in Equation 5.

1610.6.2 Drift loads on adjacent lower structures: A drift surcharge shall be applied to roofs of lower adjacent structures if these structures are located within a distance of W_d , but not greater than 20 feet, of the higher structure as depicted in Figure 1610.7. The height of drift h_d and the width of drift W_d shall be computed for wind in either direction, in accordance with 780 CMR 1610.6.1, assuming, for these computations only that there is no space between the higher and lower structures. The actual triangular drift surcharge on the roof of the lower structure shall be as shown in Figure 1610.7.

Figure 1610.6
DRIFTING SNOW AT MULTIPLE CHANGES IN ROOF ELEVATION
Figure 1610.6a

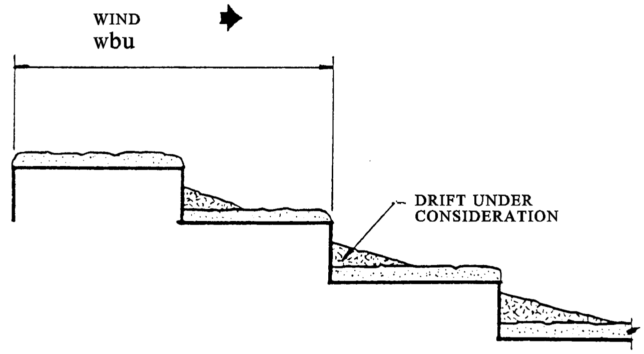
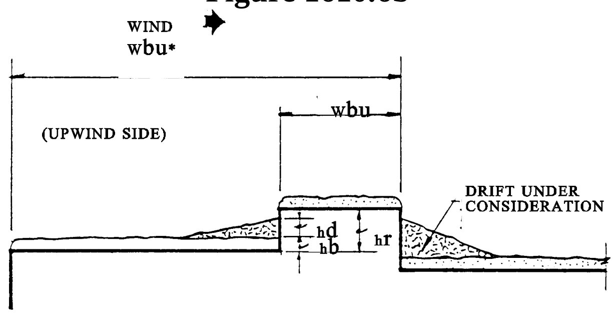


Figure 1610.6b



NOTE: Use W_{bu}* when h?$_d$ + h_b ? 7h?$_r$.